

REMARKS

The courtesies extended to the undersigned by Examiner Hemant Desai during the telephone interview held July 9, 2008 are acknowledged and appreciated. Claim 22 as currently amended, a copy of which was e-mailed to Examiner Desai, was discussed. It was the position of the Examiner that the amendments to claim 22 raised new issues and would require additional searching. In response, the undersigned is concurrently filing a Request for Continued Examination (RCE). It is believed that the claims now pending in the subject application are, as was discussed with Examiner Desai, patentable over European document EP 1 211 212 A2, referred to in the Final Office Action as the "...German reference (1211212)." Reexamination and reconsideration of the application and allowance of the claims is respectfully requested.

As was discussed with Examiner Desai, as is set forth in the Substitute Specification, as is depicted in the accompanying drawings, and as is believed to be even more clearly recited in currently amended claim 22, the subject invention is directed to a product folding apparatus. As may be seen in Fig. 1, a product, generally at 2, is moved along a transport track, such as one of the two such transport tracks 36 and 37 shown in Fig. 10, in a product transport direction, as indicated by the arrows also seen in Fig. 10. The longitudinal folding apparatus, generally at 01 in Fig. 1, is connected to the transport track and is used to receive the product. Its purpose is to put a longitudinal fold in the product, in the direction of product transport. This is accomplished by the use of a vertically reciprocable folding blade 03 that pushes the center of the product through a folding gap 06 and between spaced folding rollers 07.

The folding blade 03 is driven by a folding blade motor through a folding blade drive mechanism 05 which is controlled by a folding blade drive motor control device 10. That control device 10 controls the reciprocation of the folding blade independently of the drive system for the transport track. The folding blade is caused to vertically reciprocate, at an appropriate

product folding time, by the folding blade drive motor through the folding blade drive motor control device.

A product sensor, depicted at 18 in Figs. 1 and 2, is situated upstream or before the longitudinal folding apparatus, in the direction of travel of the products to be longitudinally folded. The product sensor 18 senses a product phase relation of the product. The product sensor then uses that product phase relation to control the folding blade motor through the folding blade drive motor control device. The result is the synchronization of the vertical reciprocation of the folding blade with the product folding time, in response to the product phase relation, as detected by the sensor. The result is that the folding blade properly reciprocates when the product to be folded is located beneath it on the folding table.

In the course of the review of the Substitute Specification of the subject application, in the course of the preparation of the subject Second Amendment, a minor typographical error was noted in paragraph 058. That minor error has been corrected by the cancellation of the original paragraph and the submission of a suitable replacement. That minor correction does not constitute any new matter.

Claims 22, 23 and 33 were rejected under 35 USC 102(b) as being anticipated by EP 1 211 212 A2 to Bressert, which was referred to in the Office Action as the German reference. Claims 24-29 and 34 were rejected under 35 USC 103(a) as being unpatentable over "German" reference 1 211 212 in view of U.S. patent No. 4,269,402 to Fischer. Claims 30-32 were rejected under 35 USC 103(a) as being unpatentable over "German" reference 1 211 212 in view of German reference 198 02 995.

As discussed with Examiner Desai during the telephone interview of July 9, 2008, and for the reasons set forth below, it is believed that claim 22, as currently amended, is patentable over the prior art cited and relied on in its rejection. In EP 1 211 212, which does not appear to have an English language equivalent but only an English language abstract, there is disclosed a method of folding sheets of material, generally at 12. Each sheet of material 12 is supported on

what is assumed to be a table 10 and is moved along the table 10 by a suitable means in the direction of a vertically reciprocable blade 34. As set forth in the English language Abstract of EP 1 211 212, "...the speed of the sheets is determined before they reach the folder..."

(Emphasis added). The sheets are released, presumably from the transport means that conveys them along the table 10, before the sheets are folded. A release point, at which the sheets are released, is calculated by determining the time at which such sheets will arrive at the folder. This is done by detecting the arrival of the sheet at a distance D from the folder. The English language Abstract of EP 1 211 212 further recites that the speed of the sheets is calculated before the sheets arrive at the folder and the release point. The required velocity profile of the blade is calculated using this sheet speed information.

It appears that the velocity of each sheet 12 is determined as each sheet is being moved toward the folding blade. The determination of such a speed will require a determination of the time required for the sheet to travel a defined distance. That requires the position of each sheet to be determined at two times. Knowing the distance between the two points and determining the time that it takes the sheet to get from the first point to the second point, provides the speed of the sheets. When each sheet arrives at what is assumed to be a sensor 14, its speed has already been determined. Since the distance between the sensor 14 and the folding blade is known; i.e. the distance D, and the speed of the sheet is also known from the prior speed determination calculations, the required velocity profile of the folding blade can be calculated. The result is that the folding blade will be in its proper position when the sheet arrives at the release point.

In both the prior art EP 1 211 212 document and in the present invention, the desired result is the same. The longitudinal folding of a sheet or a product is best accomplished when the blade engages the sheet or the product at the time when the product is properly positioned beneath the blade. If only a single product were to be folded, a great deal of time and effort could be spent on insuring an absolutely proper alignment of the sheet and the blade. However,

in a typical production situation, sheets or products continue to arrive at the longitudinal folder with only a small time interval between them. There is not a great deal of time to perform elaborate calculations and to correct folding blade operating speeds. Anything that can expedite the coordination or synchronization of the vertical folding blade reciprocation with the arrival of the products at the proper point for folding is a benefit.

In the prior EP 1 211 212 system, the speed of travel of each sheet has to be "...determined before they reach the folder and the release point..." The speed determination requires the knowledge of the time taken for each sheet to travel a specific distance. Such a calculation is relatively slow and requires the detection of the location of the sheet at two discrete times. Once that sheet velocity is known, the time it takes for the sheet to travel a set distance D, from a sensor 14 to a release point must be determined. That time is then used to calculate the required velocity profile of the folding blade. The ultimate result; i.e. proper folding of the sheet or product is the same for both the EP 1 211 212 device and the subject invention. The procedures relied on to attain that result are quite different.

As recited in currently amended claim 22, in the subject invention, there is provided a product sensor which is situated before the folding blade. As discussed in the Substitute Specification and as depicted in Figs. 1 and 2 of the drawings, this product sensor is arranged adjacent the folding table and before the folding blade. It is used to determine a product phase relation of the product. As discussed with Examiner Desai, that product phase relation is discussed in the Substitute Specification, at paragraph 058 thereof. The product sensor is used to determine either the position of the product or the time of passage of the product. It is a single product sensor that takes only one measurement of the product. The product sensor can sense the product position at a specific time; i.e. whether its leading edge, middle or trailing edge is under the sensor at a given time. Alternatively, the product sensor can sense the time of passage of the product beneath the sensor. Since the product is only one of a continuing stream of products, which are all passing along their path to the sensor beneath the product sensor,

any deviation of a specific product from its intended position or time of passage is quickly noted by the product sensor.

The folding blade motor control device is used to drive the folding blade so that it will arrive at its operation point at a product folding time. Again assuming that the ongoing stream of products are properly spaced and are all travelling at the correct speed, the product folding time can be determined and the folding blade drive motor control device will reciprocate the folding blade so that it folds each product at the proper product folding time. The Examiner is requested to note the discussion at paragraph 018 of the Substitute Specification in this regard. In the product folding apparatus of the present invention, as recited in currently amended claim 22, the product phase relation, as detected by the product sensor, is used to synchronize the vertical reciprocation of the folding blade with the appropriate product folding time. In other words, if the product sensor detects that the product phase relation is not what it is supposed to be, the product folding time of the vertically reciprocating folding blade is adjusted accordingly. Each product may be subjected to the same detection of the product phase relation so that each product will control the operation of the folding blade based on its own product phase relation.

In the prior art EP 1 211 212 document, a velocity of the product is measured, and its arrival at a certain point are used to calculate the arrival time of the sheet at the folder. In the present invention, the product phase relation is determined and is used to operate the folding blade. In the prior art device, the location of the product must be determined at two separate times and a velocity of the product then has to be calculated. Only after that product velocity has been calculated, and the product has arrived beneath a sensor, can the time of operation of the folding blade be determined. In the present invention, the product phase relation of the product is sensed only once. This product phase relation is compared with a desired time, as recited at paragraph 058 of the Substitute Specification. Only if there is a deviation, does the time of operation of the folding blade have to be changed. In any event, synchronization of the folding blade reciprocation with the product is accomplished using only one product phase relation. The

prior art approach, as set forth in EP 1 211 212 requires a different and more time-consuming protocol of velocity determinations and arrival time calculations. The subject product folding apparatus overcomes the limitations of the prior art. Thus, claim 22, as currently amended, is believed to be patentable over the EP 1 211 212 reference.

All of the remaining claims now pending in the subject application depend from believed allowable, currently amended claim 22 and are also believed to be allowable. The language of claim 33 has been added into claim 22 and that claim has been cancelled. The rejection of claim 33, as being anticipated by EP 1 211 212 has been covered in the discussion of the believed patentability of currently amended claim 22.

The two secondary references to Fischer and to Wommer have been reviewed. Fischer is directed to a longitudinal folding device that shows a belt guide for the material to be folded. Wommer is directed to a printing machine paper feed contact switch point that includes a sheet divider. Neither one of these patents discloses or suggests the structure of the subject invention, as recited in currently amended claim 22. Neither provides the teachings that are missing from EP 1 211 212.

The several other references cited by the Examiner in the Final Office Action of April 10, 2008, but not relied on in the rejections of the claims have been noted. Since they were not applied against the claims, no further discussion thereof is believed to be required.

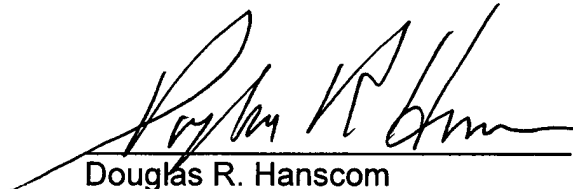
SUMMARY

One paragraph of the Substitute Specification has been amended to correct a minor typographical error. Claim 22 has been amended to more clearly patentably define the subject invention over the prior art. All of the rest of the claims now pending in the application depend from currently amended claim 22. Allowance of the claims, and passage of the application to issue is respectfully requested.

Respectfully submitted,

Holger RATZ
Applicant

JONES, TULLAR & COOPER, P.C.
Attorneys for Applicant



Douglas R. Hanscom
Reg. No. 26,600

July 10, 2008
JONES, TULLAR & COOPER, P.C.
P.O. Box 2266 Eads Station
Arlington, Virginia 22202
(703) 415-1500
Attorney Docket: W1.2315 PCT-US